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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/565,621

07/25/2006

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9905-37 (BIF116044/US)

2319

757 7590 09/12/2008
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EXAMINER

PATEL, REEMA

ART UNIT

PAPER NUMBER

2812

MAIL DATE

DELIVERY MODE

09/12/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/565,621	Applicant(s) MORICEAU ET AL.	
	Examiner REEMA PATEL	Art Unit 2812	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 July 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,5-8 and 11-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,5-8 and 11-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 July 2008 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>7/11/08</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 7/11/08 has been entered.

Information Disclosure Statement

2. The information disclosure statement (IDS) was submitted on 7/11/08. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement has been considered by the examiner.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1, 5, 12, 15, and 21-26 are rejected under 35 U.S.C. 102(b) as being anticipated by Henley et al. (U.S. 6,146,979; hereinafter 'Henley').

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5. Regarding claims 1 and 26, Henley discloses a method of fabricating a stacked structure comprising:

- a) Selecting a first plate (10, Fig. 11) and a second plate (53, Fig. 14) such that a portion of at least one of the first and second plates has a structured surface (1116, Fig. 11) (col 7, line 62 – col 8, line 3);
- b) Producing a sacrificial layer (114, Fig. 13) on at least a portion of the surface of the first plate or the surface of the second plate (col 8, lines 4-13, 59-62);
- c) Bonding the first and second plates together by bonding the sacrificial layer to a remaining first or second plate, wherein the structured surface contacts the sacrificial layer (col 8, lines 49-50; Fig. 14).

6. Henley discloses at least partially eliminating the sacrificial layer through a plasma etch process (col 8, lines 10-14) and further discloses that the plates face each other (Fig. 14).

7. Regarding claim 5, Henley discloses the structured surface has a surface roughness of greater than 0.2 nm root-mean-square (RMS) (col 7, lines 63-66, col 4, lines 35-37).

8. Regarding claim 12, Henley discloses smoothing the free surface of at least one of the plates before bonding (col 8, lines 10-14).

9. Regarding claim 15, Henley discloses bonding with a sacrificial bonding agent (col 8, lines 40-41, 49-50; Fig. 14).

10. Regarding claim 21, Henley discloses that the first plate may be removed by thinning (col 8, lines 23-26).

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11. Regarding claim 22-23, Henley discloses at least one of the plates comprises a silicon semiconductor material (col 8, line 63 – col 9, line 1).

12. Regarding claims 24-25, Henley discloses the sacrificial layer comprises silicon oxide (col 8, lines 40-41) or a polymer (col 8, lines 10-14).

13. Claims 1, 6-8, 13, 16, and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Enquist (U.S. 2003/0119379 A1).

14. Regarding claim 1, Enquist discloses a method of fabricating a stacked structure comprising:

- a) Selecting a first plate (10, Fig. 2) and a second plate (16, Fig. 3) such that a portion of at least one of the first and second plates has a structured surface ([0062], [0065]);
- b) Producing a sacrificial layer (12, Fig. 2) on at least a portion of the surface of the first plate or the surface of the second plate ([0063]);
- c) Bonding the first and second plates together by bonding the sacrificial layer to a remaining first or second plate, wherein the structured surface contacts the sacrificial layer ([0065]; Fig. 3-4).

15. Enquist discloses partially eliminating the sacrificial layer through a polishing process ([0063]) and discloses that both plates face each other (Fig. 3).

16. Regarding claims 6-8, Enquist discloses at least one of the plates initially includes a surface layer (17, Fig. 3) comprises a monocrystalline or silicon ([0063], [0065]).

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17. Regarding claim 13, Enquist discloses smoothing the free surface of the sacrificial layer and the free surface of at least one of the plates before bonding ([0062], [0065]).

18. Regarding claims 16 and 18, Enquist discloses bonding assisted by a thermal treatment atmosphere ([0065]).

19. Claims 1, 6, 11, and 17 are rejected under 35 U.S.C. 102(e) as being anticipated by Tong et al. (U.S. 6,902,987 B2; hereinafter 'Tong').

20. Regarding claim 1, Tong discloses a method of fabricating a stacked structure comprising:

- a) Selecting a first plate (30, Fig. 3A) and a second plate (35, Fig. 3D) such that a portion of at least one of the first and second plates has a structured surface with a roughness greater than a predetermined threshold (col 4, line 58 - col 5, line 5);
- b) Producing a sacrificial layer (33, Fig. 3A) on at least a portion of the surface of the first plate or the surface of the second plate (col 5, lines 5-15);
- c) Bonding the first and second plates together by bonding the sacrificial layer to a remaining first or second plate, wherein the structured surface contacts the sacrificial layer (col 6, lines 58-65; Fig. 3E).

21. Tong discloses the sacrificial layer is partially eliminated by a planarizing process (col 5, lines 17-18) and further discloses that the first and second plates face each other (Fig. 3E).

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22. Regarding claims 6 and 11, Tong discloses that one of the plates initially includes a surface layer (36, Fig. 3D) comprising silicon nitride (col 6, lines 19-24, 58-65; col 5, lines 5-15).

23. Regarding claim 17, Tong discloses applying a selected atmosphere prior to bonding (col 5, lines 57-64; Fig. 3C).

Claim Rejections - 35 USC § 103

24. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

25. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Henley et al. (U.S. 6,146,979; hereinafter 'Henley') as applied to claim 1 above, and further in view of Maleville et al. (U.S. 6,429,094 B1; hereinafter 'Maleville').

26. Regarding claim 14, Henley discloses that the substrates are bonded together but does not disclose that such a procedure is done via molecular bonding. However, Maleville discloses the use of molecular bonding in forming an SOI-type substrate (col 3, lines 51-54) since it allows for a strong bond between two substrates and enables un-bonding of the substrates along the bonding interface (col 3, lines 38-42). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of Henley with bonding by molecular bonding, as taught by Maleville, so as to achieve a strong bond between two substrates while also enabling un-bonding of the substrates along the bonding interface.

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27. Claims 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Enquist (U.S. 2003/0119379 A1) as applied to claim 16 above, and further in view of Habberger et al. (U.S. 6,417,075 B1; hereinafter 'Habberger').

28. Enquist does not disclose exposing the wafers to an open air environment before or during bonding. However, Habberger discloses exposing wafers to an open air environment so as to form a natural oxide layer which serves as a bonding area (col 4, lines 61-64). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of Enquist with exposing the wafers before and during bonding to an open air environment, as taught by Habberger, so as to form a natural oxide on the wafer which serves as the bonding area.

Response to Arguments

29. Applicant's arguments with respect to claims 1, 5-8, and 11-26 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to REEMA PATEL whose telephone number is (571)270-1436. The examiner can normally be reached on M-F, 8:00-4:30 ET.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Charles Garber can be reached on (571)272-2194. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Reema Patel/
Examiner, Art Unit 2812
9/11/08

**/Alexander G. Ghyka/
Primary Examiner, Art Unit 2812**